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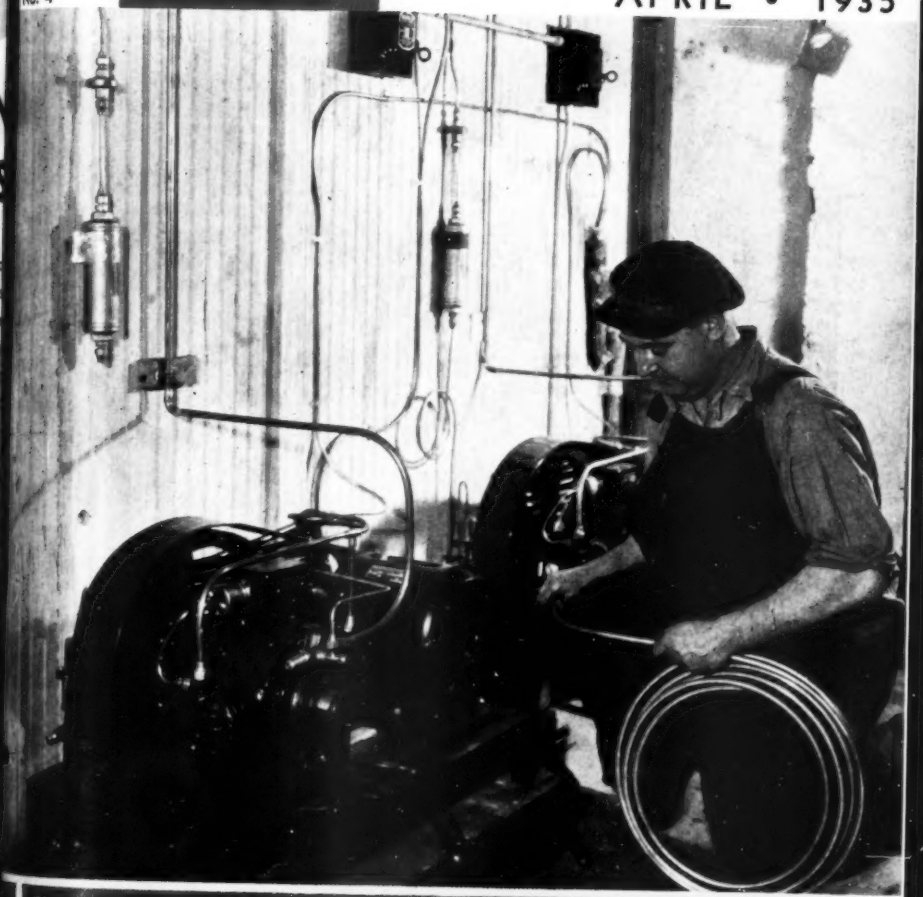

Facts About Freon • More About Thermo Expansion Valves • Two Way Tester • Questions and Answers

The REFRIGERATION SERVICE ENGINEER

Devoted to the Servicing of
REFRIGERATION UNITS *and* OIL BURNERS

VOL. 3 APRIL, 1935 NO. 4

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The Refrigeration Service Engineer

A Monthly Illustrated Journal Devoted to the Interests of the Refrigeration Service Engineer in the Servicing of Domestic and Small Commercial Refrigeration Systems and Oil Burners

OFFICIAL ORGAN REFRIGERATION SERVICE ENGINEERS' SOCIETY

VOL. 3, NO. 4 CHICAGO, APRIL, 1935 $2.00 per Annum

Facts About Freon

Its Characteristics—Pressures—Lubrication—Drying—Horse-Power

By R. J. THOMPSON*

THE refrigerant Freon is not an accidental discovery but is the result of many years of a careful and deliberate attempt to produce a compound which would be non-hazardous and practical from a mechanical standpoint.

Up to the advent of Freon there was no known refrigerant which was non-flammable or non-toxic, or both, or one which could be satisfactorily used in all types of apparatus and under various conditions of use. Specifications for the ideal refrigerant were prepared which incorporated all desirable features, about thirty-five in number, and work was started on the problem of finding such a material.

Certain of the known compounds which date back to the Fourteenth Egyptian Dynasty and others to the time of Homer were investigated and their properties determined. New families of compounds were searched for and produced, and all but one family were eliminated as they were found wanting in one or many respects. Out of this search did come a new series of compounds which more nearly approached the ideal than any other known material. These were halofluoro derivatives of aliphatic hydrocarbons, of which dichlorodifluoromethane, trichloromonofluoromethane, and dichlorotetrafluorethane were members. These compounds were the first and only refrigerants developed specifically for refrigeration purposes.

To save time in speaking and writing, and embarrassment in pronunciation and spelling, a code was set up using such letters and numerals as F-12, F-11 and F-114. For the reason that we always found it necessary to explain what F-12 meant, we have since given F-12 the name of Freon.

There are three families of hydrocarbon refrigerants—

First—Straight aliphatic hydrocarbon compounds, such as ethane, propane, butane and Isobutane, but these refrigerants need not be considered as they are highly flammable and explosive.

Second—Chlorinated hydrocarbon compounds such as methyl chloride, methylene chloride or dichloromethane and ethyl chloride. While some of these are flammable and explosive, others are relatively non-flammable and non-explosive under certain con-

* Kinetic Chemicals, Inc.

ditions of use. All of these refrigerants are relatively toxic.

Third—Halo-fluoro derivatives of aliphatic hydrocarbon compounds containing one or more fluorine atoms of which dichlorodifluoromethane, commonly known as Freon or F-12, is the best known member, are the most popular refrigerants, because they are the only refrigerants yet discovered which have good chemical, physical and thermodynamic properties and are less toxic than CO_2 and are non-irritant, non-flammable and non-explosive.

This brief description of these three groups of hydrocarbon refrigerants was given so as to avoid any confusion should you hear Freon referred to as a hydrocarbon refrigerant.

Let us now see how well Freon fulfills these specifications as drafted ten years ago.

Odor

Freon is odorless at concentrations of less than 20% by volume in air, which is equivalent to the release and vaporizing of 65 pounds of liquid into a confined space of 1000 cubic feet. At concentrations higher than 20% the odor of Freon is very mild and similar to that of carbon tetrachloride. Freon vapor in all proportions is non-irritating to the eyes, nose, throat and lungs, and being odorless and non-irritating will eliminate all possibility of a panic hazard should it escape from an air conditioning, commercial, industrial or household system.

Systems that have been installed, whether they be of the small household size using low pressure float valve, flooded systems of 1/20 ton capacity, or a large air conditioning installation of approximately 2000 tons capacity, would not produce sufficient concentration of vapor-air mixture (less than 2% or 6 pounds per thousand) to be detected by smell should the entire charge be released into the kitchen or the entire building. This feature is particularly valuable for air conditioning systems where the air to be conditioned passes over evaporators containing the refrigerant. Such systems are not in general use as yet in large buildings, although some installations of up to 100 tons capacity have been made and are also used in railway cars and private rooms as coolers.

Flammability and Explosiveness

Freon liquid or vapor is non-flammable and non-combustible as Freon-air mixtures are not capable of propagating a flame. In fact, Freon may be employed for fire extinguishing purposes as it is equivalent in this respect to carbon tetrachloride. The U. S. Bureau of Mines has issued a pamphlet, R.I.-3042, showing the flame extinguishing properties to be more than twice as good as carbon dioxide, more than four times that of nitrogen, four and one-half times that of helium, and almost seven and one-half times that of argon. Since Freon is non-flammable and non-combustible, the use of it will eliminate all possibilities of a fire or explosion hazard.

Corrosiveness

Freon is non-corrosive to all metals used in refrigeration apparatus, and this feature permits the manufacturers a wide selection of materials with which to design and produce efficient condensers, evaporators, compressors, control apparatus, and pipe lines.

We do not recommend the use of magnesium alloys or aluminum containing magnesium in systems where water may be present, as corrosion will result. The water or water vapor has a high corrosive effect on such materials, but this corrosion is neither accelerated nor retarded by the presence of Freon.

Molded packing and sheet gasket materials vary widely in composition, with the result that the safe use of such materials can be determined only after sufficient test. There are a number of manufacturers who are in position to supply the proper materials that will insure long life, performance, service, and stability.

Freon is stable and inert and will indefinitely withstand repeated evaporations, compressions and condensations without disassociation. The temperature required to cause breaking down (1022° F. dull red heat, see Underwriters' Laboratories report M.H. 2256) is very much higher than any temperature obtained within refrigerating apparatus, even under most abnormal conditions.

Effect on Foods, Flowers, Furs or Fabrics

Freon liquid or vapor is not absorbed by and has no effect on any materials being

refrigerated, and has no effect on the odor, taste, color, or structure of foods. Freon vapor has no effect on the odor, color, continued blooming, or structure of flowers or plant life. Freon has no effect on the color or structure of furs or fabrics.

Toxicity

It is now known that Freon is less toxic than carbon dioxide. This is a remarkable fact in itself as prior to April, 1930, it was not known to the scientific public that there was a gas possessing valuable properties as a refrigerant that was less toxic than carbon dioxide.

It is an established fact that Freon, F-114 and F-11 as such are the least toxic refrigerants that have yet been discovered. Permit me to quote from the recent Underwriters' Laboratories report M.H. 2375, which reads:

"Dichlorodifluoromethane appears to show no toxic effect in concentrations up to at least 20% by volume (63 pounds per 1000 cu. ft.) for durations of exposure of the order of two hours. In tests with concentrations of the order of 20.5 to 30.4% by volume (89.6 to 95.7 pounds per 1000 cu. ft.) for durations of exposure to the order of two hours, some physiological action is apparent, but whether or not this is caused primarily by oxygen deficiency is not shown in our data."

Undoubtedly the large amount of Freon that was used to cause the apparent physiological action reduced the oxygen content of the test room from 20½%, which is considered normal, to 14.3%, which is below the amount required to sustain life for long periods.

In the U. S. Bureau of Mines report R.I.-3013 it is reported that animals live for an indefinite period of time in an atmosphere of 20% Freon gas. In fact, pregnancy and bearing normal young were as frequent among animals exposed to Freon as among the controls; also, that autopsies performed on all animals revealed no gross pathology attributable to exposure to Freon.

Decomposition

Every chemist knows that when an organic compound is exposed to high temperatures it will decompose into other chemicals. This is elementary chemistry.

Freon, in common with all other organic compounds, decomposes into its halogen acids on passage through a naked flame of high temperature. The conditions required to produce decomposition products that would produce a health hazard are:

1—There must be a Freon leak in the system.

2—There must be a leak of large quantities of Freon.

3—There must be a very rapid leak of large quantities of Freon.

4—The Freon must leak into a confined, non-ventilated or hermetically sealed open space.

5—There must be an open flame in the confined space.

6—There must not be stew pans containing water on the gas flame which would absorb acids.

7—There must be a fan for circulating the heavy Freon vapor (4.2 times heavier than air) from the floor into the gas flame.

8—There must be sufficient time allowed to permit all of the Freon in the confined space to pass through the flame to be decomposed and become irritating.

9—There must be a person in the confined space who could not recognize the presence of the decomposition products.

There is not even a remote possibility that these nine conditions could occur simultaneously, other than under laboratory test conditions.

I wish to quote from the Underwriters' Laboratories report M.H. 2375, which reads:

"In the presence of flame and very hot surfaces (550° C.), dichlorodifluoromethane and dichlorotetrafluorethane are decomposed, with the formation of toxic products, which are exceedingly irritating, and therefore give adequate warning of their presence in the air even in concentrations of a very low order. The danger from the fumes depends upon the concentration and duration of exposure, but under ordinary conditions, except in unventilated places, serious danger to life is not involved.

"It is to be noted, however, that in the presence of open coil hot resistance wire units such as are used in electrical ranges for cooking, even when heated to a cherry red heat (750° C.), practically no toxic decomposition products are formed during a period of exposure of the order of ½ hour in a room without any ventilation.

"The conditions maintained in the test were severe. Neither the test conditions nor the concentrations used can be asserted to be those which will exist in any given enclosure since the size of such enclosure, the ventilation and other variables are controlling factors. The data contained in this investigation, however, are comparable and serve as a practical measure of the comparative hazards of refrigerants under working conditions

"It will be noted that in order to obtain an accurate basis for comparison the tests were conducted under conditions more severe than are encountered in practice. The test room is smaller than the average sized kitchen and no ventilation whatever is provided. Hence, effects shown by the tests are more severe than the effects obtainable under conditions to be anticipated in practice."

Let it be clearly understood that a tightly closed room containing a flame is positively and inherently a lethal chamber regardless of the presence of or absence of Freon gas. Furthermore, any test should hinge upon the worst conditions actually tolerated by people in rooms containing open flames and not on that which can be obtained in hermetically sealed test chambers or rooms.

Freon, in common with all organic materials, decomposes on passage through a naked flame, but only that portion that passes through the flame is decomposed into its halogen acids. The decomposition products can be obtained only where there is a rapid leak of large quantities of liquid Freon into a confined space, where there is no ventilation, where there are large gas flames in the room, and where there is a circulating fan which will drive the heavy Freon vapor (4.2 times heavier than air) through the gas flame.

The decomposition of the Freon vapor is not spontaneous or progressive, with the result that sufficient time must be allowed for all of the vapor to be decomposed to become irritating. Should there be decomposition products they will produce their own warning agent and cause any person to immediately ventilate the room merely by opening a door or window. The decomposition products are readily dissolved by water from automatic sprinklers or hose streams.

Do not confuse the odor or irritating properties of decomposition with harmful concentrations. Also, do not confuse combustion products of the flame with the decomposition products of the Freon gas. Such a test room would not be habitable even if there were no Freon vapor present and would be a lethal chamber due entirely to the lack of ventilation and inability to maintain a normal oxygen content of 20½%. Such a test room would be suitable only for laboratory conditions and not of a practical nature even under the most abnormal of conditions.

The best evidence of the safety of Freon in actual service is that approximately three million pounds of Freon have been used in refrigeration equipment, a large portion of which was placed in household units. Some household units which leaked, such as you and I know, were installed in kitchens adjoining gas fire ranges, but there has never been a record of complaint from any user relative to decomposition products. This is a very important fact that must not be overlooked.

To Be Continued in the May Issue

Further "Facts on Freon" will be published in the May issue, including Piston Displacement, Head Pressures, Back Pressures, Gravity, Density, Horsepower, Filtration, etc., etc.

MEMPHIS SUPPLY HOUSE

BOYD EVANS, manager of the United Refrigerator Service, 941 Madison Ave., Memphis, Tenn., has recently announced that this company has entered the wholesale supply business, carrying a complete line of parts and accessories for the independent service man.

Mr. Evans is second vice-president of the newly formed Memphis chapter of the R.S.E.S. and was active in the formation of this local organization.

Thermo Expansion Valves

Questions and Answers on Application, Servicing and Installation of the Thermostatic Expansion Valve

By D. D. WILE
Detroit Lubricator Co.

THE following questions and answers on the thermostatic expansion valve will be of interest to our readers. They are based on actual conditions experienced in the field on the installation and servicing of these valves.

Question: Does it make any difference whether that bulb is so placed that, when it warms up, the gravity flow of the liquid charge will flow back into the bellows by gravity?

ANSWER: It wouldn't make any difference. The bulb can be placed upside down or right side up. There is no particular way in which it has to be placed. The tube can come out of the bottom or top.

Question: You could take that capillary tube and put it straight up in the air with the bulb upside down?

ANSWER: Yes.

Question: Where is the proper place to put that bulb, on top the suction line side or bottom?

ANSWER: I think it makes no difference whatever.

Question: It does make a difference if the bulb happens to be in a vertical position and the tube is running off the bottom.

ANSWER: We have found that is not generally the case. It will work all right.

Question: It is just practically gas charged, then.

ANSWER: It so works out that it will work satisfactorily in that position. The liquid then tends to go into the capillary tube but as soon as it strikes the warm capillary tube, it stops flowing down and can't stay in the bulb. The heat in the capillary tube keeps it up.

Question: We are installing some ice cream freezing machines in Detroit for a Chicago company. I notice they have a little pocket for the bulb of this thermostatic expansion valve located along the brine tank and alongside the tube leaving the tank. We had occasion to start one up and the liquid was flowing through so fast that the suction pressure was coming up into the machine instead of going down. I took the bulb off there and clamped it on the suction line just as it is leaving the brine tank and managed to get it to work all right. That has always been my understanding that is the proper place, as close to the tank as possible but on the suction line.

ANSWER: That is right. The idea being that bulb is simply controlling the superheat on the suction line and we placed it on the wall of the tank. The brine was keeping the bulb warm even though the suction line was cold and frosting back. So the bulb should be clamped to the suction line in all cases.

Question: There are a good many manufacturers putting out a tank of that type with the bulb off the tank.

ANSWER: In starting those jobs up they probably have trouble but after they have once pulled down, the job will operate satisfactorily because the brine is cold enough so it doesn't keep the valve open. I wonder if we shouldn't go into this point a little more thoroughly to bring out this point that the valve should be closed throughout the entire time the machine is shut down, and that when the machine starts up it should open, open a sufficient amount to simply keep the coil completely refrigerated.

Question: May I ask a question in connection with that universal bob-tail hookup? You are familiar with that? They use perhaps 20 or 25 feet of three-eighths tubing with a thermal expansion valve at one end

and clamp the bulb at the far end in the water bath and use a No. 2 temperature valve. We had a good bit of trouble with those due to the fact they froze bottle goods and weren't able to do anything about it except place that temperature bulb clear back at about the second turn in the coil and only refrigerate two turns of that coil.

Answer: I have seen many of these working where you will get a fairly close control of temperature in the bottle goods department. I think there is no question, however, that in many cases two temperature suction line valves should be used where they have not been used in the past.

Question: The thermostatic valve should be placed with the thermostatic element at the top so the refrigerant will drain out of the valve?

ANSWER: No.

Question: I have tipped the expansion valve so all the liquid would drain out the valve as quickly as possible.

ANSWER: The important reason for placing the valve in the horizontal and avoid placing it at the bottom is simply to keep it warm. As frost collects around the body, if it were turned up the frost would tend to go down over here. I have seen lots of them operating that way.

Question: What difference in effect can be obtained by using this type of valve and inserting the bulb inside the suction line? I have found I have gotten several valves lately with the elbow already on.

ANSWER: They will work just about as well. There isn't a great deal of difference between the operation of either. Some people prefer one and some another. In some few cases—I think the Copeland people used to use that arrangement of putting the bulb in the suction line. Either one will work satisfactorily.

Question: I had a little case in which it solved the problem for me and I wondered what difference I got or if I was able to solve it some other way. The situation was in a carbon tetrachloride cleaning plant in which refrigerated carbon tetrachloride circulated through the cabinets. When I got the job to install, all I had was the two lines coming out of the suction line and I had to attach my bulb on the outside of the cabinet, which created trouble.

ANSWER: You should get the bulb back in a point where it would not warm up too fast. I want to mention the fact if you use the wrong kind of drier in the system or you have moisture in a refrigerating system, it is likely to play havoc with needles and seats in expansion valves. When moisture is in a refrigerating system, even though it is not enough to freeze up the expansion valve it invariably creates a corrosive condition. That is true of any refrigerant we know of today. And peculiarly enough, that corrosion attacks first the point of the needle and the seat, possibly due to the fact you have a high velocity of flow.

Now calcium chloride driers particularly, they are useful because they suck the moisture out of the system so quickly, but they are bad from the standpoint that they also introduce a corrosive element into the system. There are several materials that have been used for needles and seats of expansion valves and for years we have been carrying on an investigation of these materials in an effort to find something that would better stand up against the corrosion created by moisture and corrosion created by calcium chloride driers.

I wanted to bring out those points on driers. I don't know what drier to recommend but I do know that a calcium chloride drier is likely to cause a bad, dirty condition of the system with the blackening up of the system and also corrosion of the expansion valves.

Question: On the ice cream hookup, where you had the line curved inside the cabinet, hasn't that got a tendency to hold oil there?

ANSWER: No. It might on SO_2. But I know there, if you have high enough velocity through the tubing, with three-eighths or half inch tubing I don't believe you will run into oil trouble.

Question: Wouldn't a slush tank at the end of the line accomplish the same purpose?

ANSWER: The disadvantage of a slush tank, as you call it, at the end of the line is that it is simply being put there to overcome

a bad condition. Now the thing to do is to eliminate the condition itself because every time the machine starts up you are dumping useful refrigeration into the slush tank.

Question: You have the benefit from it because you use that refrigeration in the cabinet.

ANSWER: If you get rid of that condition you won't be losing any efficiency. We have found this overcomes the condition at the source.

Question: Where we have a flooded system with the old-time float valves, we find they are converting the cases by buying new cases and new coils for the cases but still using the old cooler installation. Is there any chance of getting any degree of success out of using a thermostatic expansion valve in conjunction with float valves?

ANSWER: Yes.

Question: What hookup would you use? Supposing the temperature is the same, would it tend to flood back?

ANSWER: In some cases you will find it possible to clamp the bulb to the suction line. In other instances you may find it necessary to clamp the bulb to the old float header and make it work satisfactorily.

Question: We are using new coils entirely in the cases but leaving the old installation the same as it was. The float valves are remaining in service and they are using a thermostatic valve on the case.

ANSWER: You have a multiple system; one unit on the system is a float valve and the other is a thermostatic expansion valve system. Hook them right together.

Question: We have had to go back on the first few that were installed and put long drier coils on in order to keep it from flooding back.

ANSWER: When you are working at two temperatures, especially if the thermostatic control is at a lower temperature than the float control coil, the refrigerant in the float evaporator will distill out and recondense in the coil of the other unit. And that will invariably cause a frostback when the machine starts up.

Question: I have had a great deal of success in that condition by using a check valve.

ANSWER: A check valve is an excellent solution.

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THE Question BOX
??????????????????

Readers are invited to send their problems pertaining to the servicing of household refrigerators and small commercial refrigerating equipment as well as oil burners to "The Question Box" which will be answered by competent authorities.

THE following questions submitted to this department are answered by Mr. George H. Clark, chairman National Educational and Examining Board, Refrigeration Service Engineers Society.

Have any readers other opinions regarding the problems involved. Send them to the Editor.

CONVERTING SEEGER CABINET

Question 64. I have a Seeger refrigerator about six cubic feet which I would like to make into a freezing chest to hold temperatures 10 to 15°. I have a ¼-hp. slow speed single cylinder Kelvinator compressor which I would like to use. I do not know how good the insulation is in this box but it was a very expensive one when new. It seems to have about three inches of insulation but I do not know of what material. (Porcelain inside and out.)

Will a refrigerator of this type stand 10° F. temperature? How much increase in evaporator area will I need over a 40° F. (box temperature) present coil temperature 5 to 10°, Kelvinator evaporator to hold the back pressure where the compressor will carry a load? It is equipped with an automatic expansion valve.

Will it be practical to increase the speed of the compressor 75 r.p.m. at 10-inch back pressure? SO_2? (Equipped with frostback Kelvinator thermostatic control.)

The compressor will be in a cool basement, and I believe that the condenser will carry

considerable more load without high head pressure.

I know that a question such as this is unusual and I should give you more information, but just try to give me a few pointers on a job of this kind.

ANSWER: You state that you have a refrigerator which operates at a 40° F. temperature with a coil temperature of from 5° to 10° and you want to change this to a freeze chest to operate at 10°.

Consider it this way. If we have a room temperature of 70° and a refrigerature temperature of 40°, we have a 30° temperature difference between refrigerator and room temperature. At the same time you state that you have a coil temperature of about 10° which is 30° less than the refrigerator temperature. This indicates that the surface of the evaporator is such that a 30° difference in temperature between evaporator and refrigerator temperature will take care of a 30° difference in temperature between the refrigerator and the room.

If you maintain a 10° refrigerator temperature with a 70° room, you will have a 60° difference in temperature between the refrigerator and room. This will require 60/30ths or twice as much refrigeration as you had at first. You originally had a 30° difference in temperature between evaporator and refrigerator. If you double your coil surface you would still require a 30° difference between coil and refrigerator to give double the refrigeration as required. This would require an evaporating temperature 30° lower than 10° F. or —20° F. which requires a very low operating suction pressure.

A coil area four times the former area would be more suitable, requiring only a 15° temperature difference between coil and chest or —5° F. I would suggest a 12 inch vacuum and almost double compressor speed (not to exceed 550 R.P.M.). Finned type coils are not usually suitable for this work as there can be no defrosting period when in operation. This soon cuts effectiveness of coil surface due to frost coating.

In a cool basement such an installation might be feasible, but it is not to be recommended for most cases.

Question 64. What acid is used to clean compressors and boilers of SO_2 machines that have had calcium brine get into them? What is the general cleaning process? Does the acid need to be hot or does the object just have to soak in the acid?

Cleaners

ANSWER: I am informed that a hot, strong solution of tri sodium phosphate is very beneficial in cleaning parts of this nature, and if possible, they should be blown out with steam after being cooked in the hot bath.

Gasolene, xyolene, and carbon tetrachloride are used in cleaning refrigerator compressors, evaporators and parts.

A mixture of two parts of sulphuric acid and one part of nitric acid with three parts of water is effective in cleaning copper and brass. Brass and copper parts may be hung on a wire and lowered into an acid bath for from 30 seconds to 1 minute and then removed and washed with water and dried.

Question 65. What would be the best insulation to use in constructing a small dehydrating oven and the best thickness to use? Which is the most satisfactory for heating, gas or electricity?

ANSWER: I have seen large size baking ovens which use no insulation. However, the most efficient small ovens may be insulated with 1½" thickness of asbestos. As regards the heating medium this would be determined by your local power rates. Either gas or electricity would be satisfactory, depending upon which would be most economical.

S S S

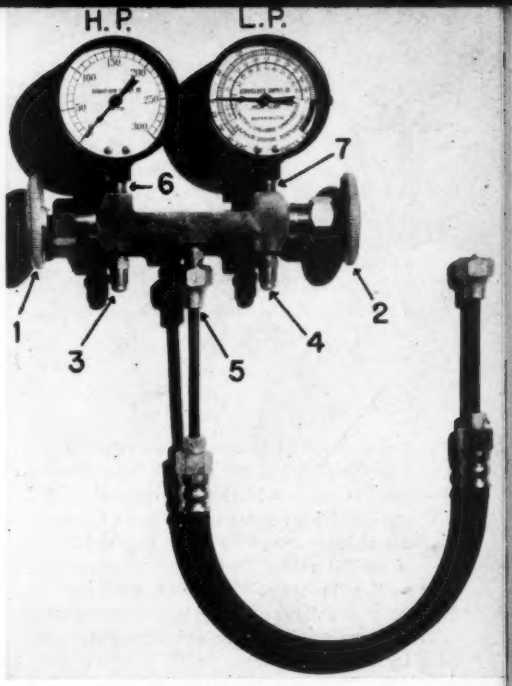
"DEAD AIR" COOLED CONDENSERS

MORE tubing is required on a dead air condenser than on those systems which use a blower or fan. With dead air condensers 10 to 12 square feet of copper tube surface per 100 lbs. I.M.E. (24 hours) is required, while with forced air only 5 to 6 square feet per 100 lbs. I.M.E. (24 hours) is needed.

Two-Way Tester aids in Service Operations

Removing Refrigerants
Leak Tester
Evacuating
Charging
Switch Setting
General Operations

By HERBERT HERKIMER



TWO WAY TESTER

THE Two-Way Testing outfit described in the following pages complete with gauges, flexible tubing and fittings, is an improvement on the apparatus in common use today. It has been designed by Mr. Herbert Herkimer, Director of the Herkimer Institute, New York City, in cooperation with the Weatherhead Co.

The Two-Way Tester, illustrated in Figure 1, has a wide variety of uses and should be included in every service man's kit. It should be used for all purposes described in the following service operations and illustrated in the diagrams. Into the female ⅛" pipe openings at *6* is inserted the high pressure gauge and at *7* the low pressure or compound gauge. The S.A.E. flare connections at *3* and *4* are connected respectively to discharge and suction service valves. The S.A.E. flare connection at *5* is usually connected to a flexible charging hose. Hand wheels may be specified for valve stems *1* and *2* thus eliminating the use of the ratchet wrench.

Definitions

The following service operations are suggested for the use of the standard two-way service valve illustrated in detail in Figure 2. The suction service valve is designated as the *A* valve; the discharge service valve as the *B* valve; the receiver valve as the *C* valve. The expression "out long" means the valve stem is out as far as it will go. The expression "in short" means that the valve stem is run in as far as it will go. The expression "in neutral" means that the service valve is not seated on either side. The expression "half-way neutral" means that the valve is half-way between "in short" and "out long."

Salvage and Removal of Refrigerants Using the Two-Way Tester

Refer to Figure 3.

1. Run both *A* and *B* valves "out long."

2. Remove *A* and *B* service valve plugs and insert fittings to which attach the two-way tester. Be sure that tester valves *1* and *2* are "in short." Connect opening *3* to *B* valve opening with flexible charging hose or copper tubing. Connect opening *4* to *A* valve with flexible charging hose or copper tubing.

3. Connect opening *5* with flexible charging hose to drum placed in cold water.

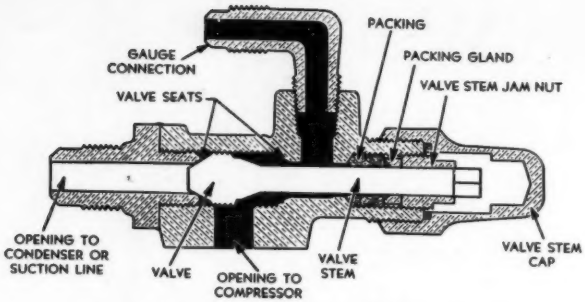


FIG. 2. STANDARD TWO WAY SERVICE VALVE

Leave flare nut loose at drum valve. Open *1* and *2* slightly. First crack back *A* valve then *B* valve with handle end of ratchet wrench, for a few seconds until air is purged out at loose connection at drum valve. Run *A* and *B* valves "out long." Tighten connection to drum. Test all connections for leaks as follows: If pressure does not drop on gauges, all connections are tight. Also try the smell test.

4. Open drum valve—never to exceed four turns.

5. Run valve *1* "out long." Be sure that valve *2* is "in short."

6. Run *B* valve "in short." Be sure receiver valve is open and expansion valve open, all openings clear on other valve openings and *A* valve cracked back for gauge reading.

7. Start compressor. The gas will be sucked out of system and pumped into drum, which acts as a water-cooled condenser. The charge is considered removed when the receiver becomes cold and then gradually warms up to machine room temperature. Sometimes frost accumulates on receiver and when the frost melts off receiver, the charge is considered removed.

8. When charge is considered removed, stop motor. Close drum valve. Run valve *1* "in short." Run *A* and *B* service valves "out long." Remove two-way tester and fittings. Insert plugs.

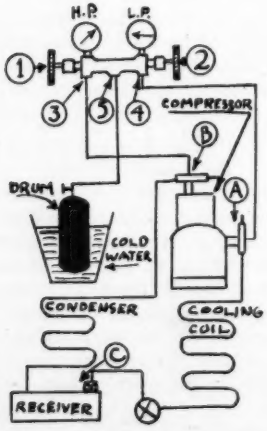


FIG. 3

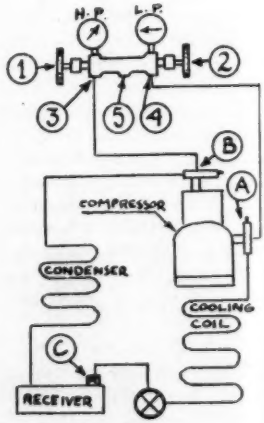


FIG. 4

Testing for Leaks With Compressed Air Using the Two-Way Tester

Upon completion of assembling of a plant and before charging, the whole system should be given a compressed air test for leaks.

Refer to Figure 4.

1. Put on the two-way tester. Always have tester valves *1* and *2* "in short" before starting.

2. Open valve *2* by running "out long."

3. Run service valve *A* "in short."

4. Run *B* valve "out long" and crack back for gauge reading.

5. Start compressor and suck in air through opening *5*. Pump up to not exceeding 100 lbs. pressure unless retard compound gauge is used.

6. Run valve *2* "in short."

7. Stop compressor. If piston and compressor valves are not tight, the low pressure will rise and the high pressure will drop, balancing at about 50 lbs. Paint joints on high side with brush and soap suds to discover leaks. To test low side for leaks, plug or cap opening *5*, then equalize pressure by opening *1*, setting *A* in neutral, and opening *2*.

Evacuating Air and Preparing an Empty System for Charging Through the Low Side

Refer to Figure 5.

1. Put on two-way tester. Connect opening *3* to *B* valve and opening *4* to *A* valve.

2. Open valve *1*. Close valve *2*.

3. Run *B* valve "in short."

4. Check to see if all valves are open and lines clear, especially receiver valve. Run *A* valve "out long" and crack back for gauge reading.

5. Start compressor to discharge air through tubing connected to opening *5*. After running about five minutes, dip tubing at *5* into jar of clean refrigerating oil.

6. If system is tight and all air removed, bubbles will discontinue flowing through oil after fifteen minutes operation. If bubbles do not stop, it is assumed that there is a seal leak or a connection leak, which is discovered only by again going through compressed air test described under preceding heading, "Testing for Leaks, etc."

7. After bubbles stop, remove from oil the line connected to *5 but leave compressor running*. Run *1* "in short."

8. Attach drum tight to charging line at *5*. Open drum valve one-half turn. Test connections for leaks by smell or gauge test.

9. Purge air from the compression chamber by loosening flare at connection *3*, and cracking open valve *2* for a few seconds with handle of ratchet wrench. Gas will flow out of loosened flare nut at connection *3*. Tighten flare nut at connection *3*. The system is now free of all air. Note compressor is still running.

10. Run receiver valve *C* "in short." Run *A* valve "in short."

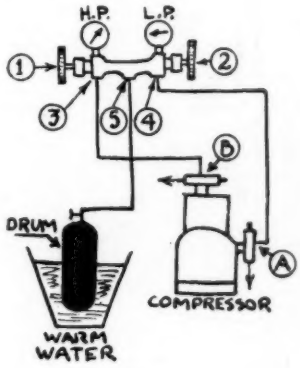


FIG. 5

11. CAUTION. *Be sure not to forget to run B valve "out long" and crack back for gauge reading.*

12. Open wide valve *2* with handle or wrench, and gas proceeds to enter system. Decide how much gas to be charged, and weigh service drum with pocket scale.

13. Place drum in warm water and manipulate drum valve to maintain 10 lbs. charging pressure. Remove drum from water and weigh drum every 10 minutes. Weighing with scale is the only sure way of charging correct weight. NOTE: The above is an approved method of charging all systems *except* the high pressure float system.

14. After it has been estimated that correct charge is in system, close drum valve, run valves *1* and *2* "in short," run *A* and *B* valves "out long" and remove two-way tester

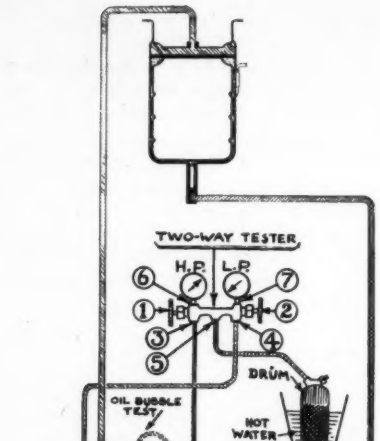


FIG. 6

outfit. Insert plugs in *A* and *B* valves tight.

15. Start operation after checking fly wheel clearances. Open receiver valve *C*.

CAUTION: *Drum must remain vertical during charging period. This prevents refrigerant in form of liquid being sucked into crankcase.*

Preparing an Empty High Side Float System for Charging by Evacuating Air Using the Two-Way Tester as a By-Pass

Due to the fact that a high side float system when empty completely restricts the orifice, air can be evacuated from the condenser only by means of a by-pass connection. The two-way tester is easily adaptable for use as a by-pass, Figure 6.

1. Put on two-way tester with valves *1* and *2* closed, connecting opening *3* to *D* valve and cracking back *D* valve for gauge reading. Connect opening *4* to *A* valve. Attach drum of refrigerant tight to charging line at *5* and test for leaks by opening up drum valve slightly, then closing, using soap and water or smell test.

2. Open valve *1*. Open valve *2*.

3. Run *B* valve "in short." Remove plug at *B*.

4. Check to see if all other valves are open and lines clear, especially receiver valve *C*. Run *A* valve "out long" and crack back for gauge reading.

5. Start compressor to discharge air through tubing connected to plug opening at *B*. After running about five minutes, dip tubing at plug *B* into jar of clean refrigerating oil.

6. If system is tight and all air removed from both sides of float needle, bubbles will discontinue flowing through oil after about fifteen minutes' operation. If bubbles do not stop, it is assumed that there is a seal leak or a connection leak, which is discovered only by going through compressed air test described in service operation following, "Testing a Complete High Side Float, etc."

7. After bubbles stop, remove from oil the oil bubble line connected to plug *B*, but leave compressor running. Insert plug loose at *B*.

8. Run valves *1* and *2* in short. Open drum valve one-half turn.

9. Purge air from compression chamber at loose *B* plug, cracking open valve *2* for a few seconds with handle end if ratchet wrench is used. First air, then gas will proceed to flow out of plug at *B* for a few seconds. Be sure to close valve *2*. Tighten

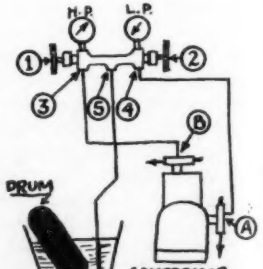


FIG. 7

plug *B*. The system is now free of all air. Note: Compressor is still running.

10. Run receiver valve *C* "in short." Run *A* valve "in short."

11. CAUTION: *Be sure not to forget to run B valve out long before opening 2 to avoid breaking gauge or straining parts by excess pressure due to gas being sucked in.*

12. Open wide valve *2* and gas proceeds to enter system. Decide how much gas to be charged and weigh drum with pocket scale before and after charging. CAUTION: *A high side system is exceedingly sensitive to correct charging, much more so than low pressure system or direct expansion system.*

13. Place drum in warm water and manipulate drum valve to maintain 10 lbs. pressure. Remove drum from water and weigh drum every ten minutes with pocket scale. Weighing with scale is only sure way of charging correctly.

14. After it has been estimated that correct charge is in system, close drum valve and remove drum from hot water. Remove two-way tester by running *D* valve "in short," running *A* valve "out long," removing connections and inserting plugs at *A* and *D* valves.

15. Close valves *1* and *2* before replacing two-way tester in kit.

16. Check fly wheel clearances and open receiver valve. Start machine in operation.

Testing a Complete High Side Float System for Leaks with Compressed Air Using the Two-Way Tester

Refer to Figure 6.

1. Put on two-way tester having valves *1* and *2* "in short" before starting.

2. Open valve *2* by running "out long."

3. Run service valve *A* "in short." Have both *C* and *D* valves in neutral, *B* "out long."

4. Start compressor and suck in air through opening *5* and pump up to not exceeding 100 lbs. pressure unless retard compound gauge is used. Air pressure is now only in condenser and float chamber there being no pressure on the low side.

5. To obtain pressure on the low side plug or close opening *5*. Open *1* and run valve *A* in neutral. Pressure will then be obtained on the whole system.

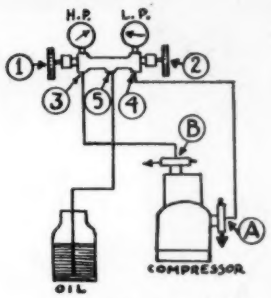


FIG. 8

Charging Liquid Refrigerant Through High Side

While this method is not recommended, it may be done as follows. (Refer to Figure 7.)

1. Install two-way tester in usual manner. Valve *2* is closed. Valve *B* is left at half-way neutral. Valve *1* is open.

2. Connect flexible tubing between outlet *5* and drum of refrigerant.

3. Open drum valve not exceeding four turns. Insert drum upside-down in hot water. Liquid refrigerant will flow up-hill due to pressure generated by the hot water into the high side.

4. Remove two-way tester in usual manner.

NOTE: Compressor does not run during this operation.

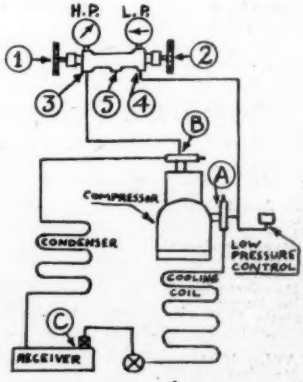
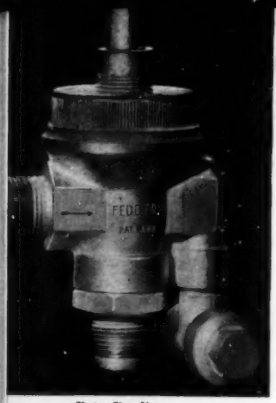


FIG. 6



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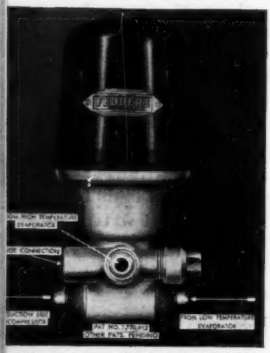

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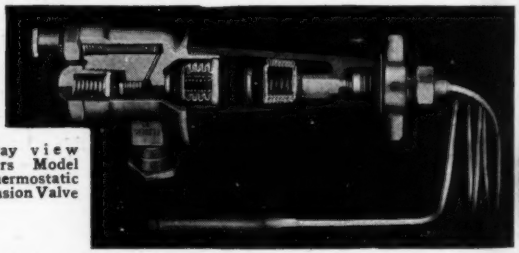

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Are You Getting Your Copy of the FEDDERS NEWS?

Charging Oil Through Low Side by Suction Through the Two-Way Tester

Refer to Figure 8.

1. Avoid sucking in air during this operation. If the oil capacity of the crankcase is not known, estimate roughly the cubic inches of space in crankcase up to level of shaft and allow 30 cubic inches of oil to the pint. Pour the amount estimated into a dry, clean container and add two more inches extra depth in the container.

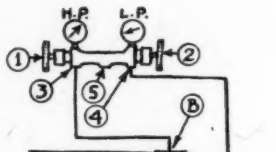


FIG. 10

2. Install two-way tester in usual manner. Run *A* valve and *B* valve "out long," running a line from opening *5* to a jar of oil as shown in drawing. Purge the air out of the connections by cracking back *1* and *B* valves allowing high pressure gas to blow through the jar of oil. Prepare system to suck in oil. Run valves *1* and *2* "in short," leaving tubing close to bottom of oil. Run *A* valve "in short." Start compressor in operation and with handle end of ratchet wrench, crack open valve *2* until the proper amount of oil is sucked into system, then close *2*. Do this carefully if oil slugging starts.

3. Remove two-way tester in usual manner.

Setting a Low Pressure Control Switch with the Two-Way Tester

Refer to Figure 9.

1. Install two-way tester in the usual manner. Seal opening *5*. Run valve *1* "in short" and crack back *2*.

2. Run *A* valve "in short" and *B* valve "out long" and crack back for gauge reading. Operate compressor until proper cut-out pressure is obtained, then set switch. It is assumed that the switch is connected to tee in *A* valve. To get the "cut-in" quickly if the back pressure is not high enough, open valve *1* with handle end of ratchet wrench to build up pressure on low side. Set switch to "cut-in" as pressure rises.

General Operations

The opening at *5*, Figure 10, should be temporarily sealed in order to perform the following operations when refrigerant is in system:

Testing Low Side for Leaks

Valves *1* and *2* open and valves *A* and *B* run "out long" and cracked back.

Setting Expansion Valve

Valves *1* and *2* closed. *A* valve run "out long" and cracked back. *B* valve run "out long."

Setting Low Side Controls

Same operation as described above "Setting Expansion Valve."

\$ \$ \$

LARKIN OPENS NEW PLANTS & EXPANDS LINE OF COILS

AFTER many months of preparation Larkin Refrigerating Corp. is introducing its 1935 line of refrigeration and air conditioning coils, which will be the most comprehensive line in the company's history. At the same time it is announcing the acquisition of additional factories in New York City and Chicago to handle production of the line which has been expanded from 124 to 756 models.

The plant in New York is located at 102 Fifth Ave. and the Chicago plant at 325 S. California Ave. These factories are equipped to construct any cross fin type of coil, and consulting engineers at these plants will work on engineering problems involving coils not included in the regular Larkin line.

According to Lester U. Larkin, vice-president of Larkin Refrigerating Corp., a number of new developments in Larkin coil design and construction have been incorporated in the new models.

Every Larkin coil is now built with stag-

gered tubing. With staggered tubing in the coil, Mr. Larkin claims, the air passing through the average coil comes in contact with a maximum amount of tube surface. Increased contact of air with the tubes, declares Mr. Larkin, materially increases the amount and speed of heat transfer, increasing the back pressure and resulting in decreased operating time and lower cost of operation.

Another development in Larkin coils is the "Inrfin" (internal fin), which is now incorporated in every tube of every Larkin coil. This type of construction is designed to meet the problem of overcoming the difference which is said to exist between the exterior tube (prime surface) temperature and the internal gas temperature.

This temperature difference, says Mr. Larkin, results from an oil film, or skin surface of bubbles, which covers the inner wall of the tube and materially retards the transfer of heat from the tube wall to the gas inside the tube. The problem, in the minds of Larkin engineers, was to break this film and conduct the heat directly from the inner wall of the tube to the relatively lower temperature existing in the central area of the tube.

Larkin's answer was the designing and fabricating of an internal fin of metal which is forced into the tube. This internal fin has an inherent spring pressure forming a metal-to-metal contact with the inside of the tube. The "Inrfin" lies along the side walls and bottom of the tube, and is said to break the film which previously existed. It is perforated so as to allow free passage of the liquid and gas from one segment of the tube to the other.

A refinement in the application of silver solder in bonding return bends to the tubing is claimed by Larkin this year. The joints on the new Larkin coils are not only silver soldered, but the return bends themselves are flared and the flanges are expanded to a depth sufficient to give to the coil a silver solder bond which Larkin guarantees to be stronger than the tubing itself. The return bend has a full opening which permits free flow of gases with a minimum of restriction.

Larkin silver soldered joints permit the continuance of the use of hairpin bends which in turn allow the retention of the continuous fin (one fin to embrace all the tubes used in a coil), which has long been one of Larkin's big features.

Realizing that it is essential to embody maximum efficiency in the coils for air conditioning applications and that in the majority of cases these coils must be of a particular size for a particular application, Larkin has installed in its factories equipment which enables them to build into its air-conditioning coils all of the previously described special features.

To meet varying applications and demands, Larkin now offers three new separate and distinct lines. These are known as the New 100 Per Cent Line, the Intermediate Line, and the Standard Line. The Larkin features of staggered tubing, "Inrfin," imbedded fin-to-tube contact, guaranteed silver soldered bond and continuous fin are embodied in all three lines. According to Mr. Larkin, the company is announcing substantially reduced prices along with the introduction of the new line. The new Larkin catalog is now being mailed to the trade.

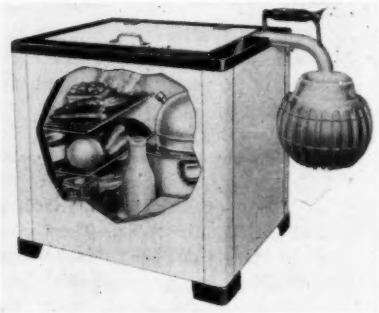
CROSLEY ICYBALL

THAT Crosley Icyball refrigerating units, in which refrigeration is developed by heating one of the balls, are having a wide sale in the South in isolated regions not reached by electric power lines, was revealed by Lee Bird, Crosley field service manager, on his return from a recent tour of the Southern States.

"Some years ago we tried to drop Icyballs," said Mr. Bird, "but the demand for them would not permit us to. In certain sections—those away from electric power—they are going over in a big way. They are ideal for use in isolated regions, in summer resorts, tourist camps, roadside stands, country stores, etc.

"Equipped with a stabilizer located in the box or cabinet in which the refrigerating part of the unit is placed, the temperature is held between 50 and 34 degrees Fahrenheit for a period of from 18 to 24 hours. Where the Icyball is used to refrigerate bot-

tled drinks, the refrigerating unit is placed in water which serves as a temperature equalizer and hold-over for refrigeration. The amount of water used is in proportion to the amount of refrigeration that can be supplied by the particular size Icyball used. The size of the container regulates the maximum low point of temperature."



CROSLEY ICYBALL

The freezing unit consists of two special metal balls joined together by a strong metal tube. These balls contain a harmless liquid refrigerant hermetically sealed. The cold ball is submerged in a tub of water while the hot ball is placed over the stove. This is "cooked" for about an hour-and-a-half to force the refrigerant into the cold ball, which is then placed inside the cabinet. The refrigerant gradually vaporizes and returns to the hot ball. This action keeps the inside of the refrigerator uniformly cold.

S S S

EVAPORATOR LUBRICATION

MUCH difficulty has been experienced in returning lubricant from evaporator to compressor. An excessive amount of lubrication in evaporator will reduce heat transfer capacity. It is an advantage to have the evaporator located above the compressor so that oil in the suction line flows back to the compressor. There is not much difficulty in the return of oil in the direct expansion system. However, in a flooded system the lubricant may congeal due to a low temperature and will settle in the bottom of an evaporator and will not return.

KRUPP PRESSURE CONTROLLED WATER REGULATOR

THE Krupp Type F water regulator is especially recommended for units where a variable flow of water is desired. It is designed for methyl, Freon and sulphur. The supply of water is automatically regulated by the condensing head pressure in the refrigerating system. The regulator opens gradually as the head pressure rises, and closes as the pressure is reduced.

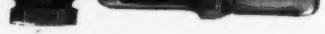
KRUPP TYPE F WATER REGULATOR

The type F regulator comprises two individual and complete units, water valve body and regulating bellows assembly. These two units are mounted on a sturdy frame designed to allow the water valve to be connected in any position wanted, with easy accessibility for adjustment if required.

The water valve body is machined of cast bronze. The stuffing box is eliminated by the use of a plated syphon bellows of sufficient convolutions to insure long life and to allow ample movement in the operation of the valve.

The valve is equipped with a renewable composition rubber seat mounted in a piston type carrier which prevents chatter or operating noises, and maintains a tight and even seal when closed. The seat spring is capable of withstanding all water pressures encountered up to 110 lbs. Heavier springs for higher water pressures will be furnished upon request.

The regulating bellows unit is of the external pressure actuated type, using a double ply bellows that will withstand pressures up to 200 lbs. The bellows are directly balanced by a spring which can be adjusted by the hexagon nut provided in assembly, to any desired pressure. Accurate regulation is assured at all times.



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REFRIGERANT DRUM CHART

OUNCES OF REFRIGERANT TO APPROXIMATELY HALF-FILL A RECEIVER PER FOOT OF LENGTH

REFRIGERANT	INTERNAL DIAMETER IN INCHES OF RECEIVER OR DRUM													
	1	1¼	1½	2	2½	3	3½	4	4½	5	6	8	10	12
	OUNCES PER FOOT OF LENGTH OF RECEIVER OR DRUM													
SULPHUR DIOXIDE FREON (F-12)	4	7	10	17	25	35	45	60	75	100	145	250	400	550
CARRENE	3½	5	8	15	22	31	41	56	71	90	130	230	370	520
METHYL CHLORIDE ETHYL CHLORIDE CARBON DIOXIDE	2½	4	6	11	16	24	30	40	50	65	90	170	270	380
AMMONIA	2	3½	4½	7½	11	17	22	29	35	45	65	110	176	250
ISOBUTANE	1½	2½	3½	7	10	14	18	25	31	40	56	109	174	245

NOTE: A receiver is fully charged when about ½ filled. Allowance must be made to hold liquid in coils when pumping down.

Example 1:—How many lbs. of sulphur dioxide required to charge a receiver 4″ diameter and 8″ long.

RULE:—Multiply ounces per foot to half fill by length in inches and divide product by 192 (roughly 200).

$$\frac{60 \times 8}{16 \times 12} = \frac{480}{192} = \frac{480}{200} \text{ Approx.} = 2.4 \text{ lbs.}$$

NOTE:—Space occupied by lubricating oil in solution not included above. Allow ¼ to ⅓ more volume to allow for oil.

19

Cut out along outer line and insert in binder for ready reference.

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STIFF competition discloses some strange practices in refrigeration installations. There can be no question but that the past economic conditions have placed a good percentage of us on a price-buying basis rather than on a quality-buying basis. Price-buying can eventually lead to only one thing in the majority of instances, and that is "dissatisfaction."

Possibly we shouldn't be too harsh in our criticism of this practice, because after all, we all know that in many cases, some of these installations have been made just to "tide over" an urgent present need. But with business conditions showing a little brighter outlook it is logical to assume that we can look forward to more sensible buying habits.

This writer has seen only too well the evidences of price-buying methods, and the inclination of some service men to be a party to these conditions. We all know the thorough dissatisfaction of the user of this type of installation, who vows by "all that's holy" to discourage his other merchant friends from purchasing the equipment which he bought. This type of advertising is not to be desired.

Yet, it is a strange thing how the purchaser's supposed shrewdness has led him into his own trap. When he finally gets through, he finds his completed job, after the necessary changes have been made, costs him as much, if not more, than the original quotation.

It's an old story of the anxiety of some salesmen in selling under-capacity jobs not valved right, and the host of other short cuts to meet the low price, with an effort to show a profit.

If there is any moral to this lesson, it is this: Ultimate satisfaction can come only from a job that has been "engineered right."

We know that the manufacturer is interested in proper installation, and has recommended certain standards of practice to be followed in the installation of his equipment patterned after many years' experience.

It is not an uncommon practice for purchasers of commercial equipment to play one bid against the others until the final price is about one-third of the first bid. The net result is that the final job is only 33⅓% as satisfactory, and sometimes this figure is even greater, when considering the time element and the spoilage that may be incurred in getting the equipment to operate satisfactorily.

It is not an easy matter to turn down any job, but is certainly more profitable than to lose future business as the result of one poor installation. There is no better way to close sales, than to show prospective customers several satisfactory installations.

S S S

J. O. DANCE,
Massachusetts.

YOUR REFRIGERATION SERVICE ENGINEER is a great little book and I derive a good deal of information that is handy to keep in the back of my head and use to good advantage. Your consideration in getting information for your subscribers is what I call cooperation to a "T."

J. Grant,
New Jersey.

I have received more information from the copies of THE REFRIGERATION SERVICE ENGINEER than from any other source. When I need information on a job, I get out the old reliable, THE REFRIGERATION SERVICE ENGINEER.

REFRIGERATION SERVICE ENGINEERS' SOCIETY

Official Announcements of the activities of the National Society and Local Chapters appear in this department as well as articles pertaining to the educational work of the Society.

THE OBJECTS OF THE SOCIETY

To further the education and elevation of its members in the art and science of refrigeration engineering; with special reference to servicing and installation of domestic and small commercial equipment; for the reading and discussion of appropriate papers and lectures; the preparation and distribution among the membership of useful and practical information concerning the design, construction, operation and servicing of refrigerating machinery.

ASSOCIATION HEADQUARTERS: 433-435 North Waller Ave., CHICAGO, ILL.

ADVANCE NEWS FROM DETROIT

DON'T PUT IT OFF! Plan now to spend your vacation in Detroit during the Second Annual Convention of The Refrigeration Service Engineers' Society. There will be something doing every minute. Up-to-the-minute educational features, interesting exhibits of new products, entertainment that will make you hate to go home. Special entertainment for the ladies. Theatres, bridge, dancing, golf, and what have you? Three days just crammed full of action.

Detroit Chapter urges every member to attend this convention. Rates will be extremely low, at one of Detroit's finest hotels.

Put a Ring Around the Date Now!

OCTOBER 23, 24, and 25TH

KANSAS CITY CHAPTER

Meeting of March 14

By C. F. Ramey, Temporary Secretary

TEMPORARY PRESIDENT S. A. Leitner called the meeting to order.

A special communication from H. T. McDermott, National Secretary, explaining more in detail the purposes and objects of Society, was read by President Leitner.

The Petition for Charter was read again by President Leitner and passed around for reading and signature of new applicants. Request was made that applications for membership be completed and turned in with initiation fee as soon as possible, so that formal application for our charter to the National Society might be made.

President Leitner stated the duties of the Membership Committee, and announced appointment of committee, consisting of the following: Roy F. Cox, W. R. Jones and Richard T. Ransdell.

Remarks were made by Mr. Cox, chairman, on membership drive. Also by Mr. Ransdell and Mr. Jones. Suggestion made that the Temporary Secretary be given assistance in getting applications and initiation fees in for Charter Members.

Special remarks were made by Mr. D. D. Pollock regarding the desirability for formation of the Kansas City Chapter and the benefits to be derived therefrom.

Discussion was held regarding selecting dates for future meetings. Motion made by F. E. Furlow, seconded by D. W. Ransdell that meetings be held on 2nd and 4th Tuesdays of each month. Motion carried.

Discussion was also held regarding the date of next meeting, inasmuch as no further meetings would be held until acceptance or rejection of our petition to the National Society. Motion made by R. E. Kingsolver, seconded by D. W. Ransdell that the Temporary Secretary be authorized to mail notice to members, after receiving acceptance or rejection from the National Secretary, calling a meeting on the next Tuesday.

Remarks and comments were made by Mr. Leitner, Pres. Pro Tem with open discussion, regarding future of sales of electric refrigerators and the service thereon.

HAPPENINGS AMONG OHIO CHAPTERS

By the Roving Reporter

WHEN it comes to swearing Mac sure knows his oaths (I am referring to the obligation of new members). And it takes men like him to make those tissue paper hats of red and yellow look good.

We have heard "that walls do not a prison make," so take heart, Cleveland and Akron.

President Farr of Cleveland sticks pretty close to home, according to Akronites who have been expecting him to pay them a visit; thus belieing his name. But we understand Mrs. Farr wonders.

Who is that treasurer that claims the Society has helped him to make more money? And does he look slick in that double-breasted suit.

'Tis rumored by the rumorers that some secretaries are being closely watched as to why reports of meetings have not been promptly sent to National headquarters.

It is our understanding that a good secretary is quite a minute man, but it seems that Mac spends hours in Chicago waiting for official news of chapters and finally has to get it second hand. From now on he is going to watch Cleveland, Akron, Youngstown secretaries very closely.

One thing about Stewart in Akron—when he gets through saying what the others are thinking the boys are puzzled as to whether he is pulling a mind-reading stunt or has been reading their mail. But then we have heard that "great minds run in the same channels." So look out, Youngstown and Cleveland, and when the exams come Akron chapter is liable to lead.—*E. S. W.*

DETROIT CHAPTER

Meeting of March 20

By J. E. Perry, Secretary

THE Membership Committee reported and turned in four new applications.

The Entertainment Committee laid out plans for a dance to be held at the Tuller Hotel.

Mr. Clark of the Educational Committee gave a short discussion on refrigeration controls.

The meeting was then turned over to Mr. Graham and Mr. Lea of the Chase Brass & Copper Co. who for one hour and fifteen minutes gave a very interesting talk and demonstration on the uses of sweat joint fittings. Here's an orchid to Mr. Graham and Mr. Lea who really did a fine job. The meeting adjourned at 11:00 P. M.

MILWAUKEE RETURNS CHICAGO VISIT

THE meeting was called to order by President Jacobsen in Chicago Chapter's own hall at 2111 West Jackson Blvd. All regular order of business was dispensed with and Mr. Jacobsen gave an address of welcome to the Milwaukee Chapter of the R.S.E.S. and the Masters Refrigeration Service & Installation Association. Mr. Lester, President, replied in behalf of the Milwaukee Chapter, and Mr. George Monjian replied in behalf of the Masters Ass'n.

Mr. Herman Goldberg, Chairman of the Entertainment Committee, then took charge. Cigars were passed around and a few of the visitors called upon for remarks.

Our National President, Mr. Fowler, gave an account of the plans for the next Na-

tional Convention of the R.S.E.S. in Detroit, Mich.

Mr. Carl Buddenbaum, attorney for the Masters Association, gave an interesting account of the objects of this Association and urged closer cooperation between the two Societies.

Several other visitors were called upon and appropriate comments were made.

Refreshments were then served and good fellowship reigned surpreme.

In order that the Milwaukee members might catch the 11:30 P. M. train, the meeting adjourned at 11:15 P. M. and the members were transported to the nearest station.

CHICAGO CHAPTER CHATTER

By Herman Goldberg

NOT much scandal this time but lots of news.

Our dinner dance will be held in the Grand Ballroom of the St. Clair Hotel, Saturday, May 4th, and the entertainment committee has made arrangements for a fine dinner, good orchestra, and swell entertainment so that a good time should be had by all.

We hope the boys from the Milwaukee Chapter enjoyed themselves at our joint meeting, including their "Lost Battalion," who came in just in time to go home. The Milwaukee gang is certainly a fine bunch of fellows and we were extremely pleased to be their hosts.

It will probably be news to the boys from Milwaukee that some of the Chicago members continued until 5 o'clock in the morning.

The championship as to who has the greatest capacity for "dunking" is still in doubt as all contestants as well as the judges apparently could not all agree after several hours.

Incidentally, it was nice to have the various members of the Masters Refrigeration Service and Installation Association with us and I hope they all had a good time.

At any rate, I am sure that without question, everybody including the members of the Masters Association had a liberal education as to the liquid and food capacity of the average man belonging to the R. S. E. S.

Don't forget the National Convention that will be held in Detroit during October. Make your plans now.

AKRON CHAPTER

FOR this month's report of activities of Akron Chaupter we reproduce in part a letter from Mr. Charles Hall, the capable secretary of the local chapter:

"We are going to have a real meeting April 4, and three new members are slated to put their applications in at that time. I have given invitations to three new prospective members for our next meeting and all indications point to a good meeting.

"The boys of Akron Chapter have been making plans to visit some of our neighboring Chapters in the near future. It is gratifying for me to report how the members of our Chapter are working together since they have had the opportunity, through our local organization, to become better acquainted, and that alone makes for a real organization. Our members want to get together for a dinner and have a real social chat with their competitors and discuss problems of mutual consideration.

"On March 24 when we received our charter we had an opportunity of expressing our opinions of the Society and it is sufficient to say that all opinions were favorable, and we are all working to carry out the objects of our organization. Just as an indication of how the organization works, I have had members call me to ascertain if I had anything to sell in the way of used equipment and even to the extent of helping out each other on a job that some member might not be entirely familiar with. That's what I call real cooperation.

"We wish to thank our National Secretary and our National President for their splendid work, and also the National Educational and Examining Board under the direction of Mr. George H. Clark for getting out some real educational material that we can use in the field every day. These boys are surely doing their part, and let's all get behind and make a real Society—both National and Local. CHARLES HALL, *Secretary.*

CLASSIFIED ADS

POSITION WANTED—Young married man, Coyne graduate, wants to connect with electrical refrigeration company or dealer to more fully learn service end. Can furnish reference. Central states preferred. Address Box 104, THE REFRIGERATION SERVICE ENGINEER, 435 N. Waller Ave., Chicago, Ill.

WE are interested in placing responsible service men. If you have an opening for a qualified service man, write us and we will be glad to refer you to several parties. Address Box 105, REFRIGERATION SERVICE ENGINEER, 435 N. Waller Ave., Chicago, Ill.

You Are Invited . . .

to participate in
the activities of the

REFRIGERATION SERVICE ENGINEERS' SOCIETY

Initiation Fee
$2.50
Annual Dues
$5.00

an educational engineering association to further the advancement of the refrigeration servicing profession.

This national organization of service men comprising the representative service men throughout the country is organized to serve its membership by keeping them currently informed on the advancement and developments in mechanical refrigeration.

It also provides an active organization which at all times represents and works for the best interests of the profession throughout the country.

If you are actively engaged in this profession, identify yourself with the organization which represents your interests. We suggest you write to National Headquarters for complete information as to how this Society is serving its membership.

A Local Chapter . . .

in your city. The National Society will aid in the formation of a local chapter. Ten or more active service men are required to form a chapter. The National Society will assist.

ANY SERVICE JOB

can be done quicker and easier with a

Turner Halide Detector

Will instantly locate the slightest leakage of any Chlorinated Hydrocarbon Refrigerant. It is extremely sensitive and absolutely dependable.

Sturdy in construction, easy to carry, simple to operate. Will pay for itself in time saved.

Used and endorsed by thousands of service men everywhere. Used by all leading manufacturers for factory tests.

Your jobber can supply you or write us for full particulars.

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420 Park Ave. Sycamore, Ill.

BAKER REFRIGERATION

Baker Specializes in All Types of REFRIGERATION and AIR CONDITIONING

For thirty years Baker has been recognized as a leader in the manufacture, engineering, and installation of refrigerating equipment. Precision built and designed for long life and operating economy, Baker's complete line includes:

COMPRESSORS (Freon, Methyl-Chloride and Ammonia)
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BAUDELOT TYPE COOLERS
HORIZONTAL MULTI-UNIT CONDENSERS
ATMOSPHERIC CONDENSERS (All Types)
AUTOMATIC CONTROL and Accessories
COOLING TOWERS
SPRAY PONDS
FORCED DRAFT COOLING UNITS
COOLING COILS (All Types)
VALVES AND FITTINGS (All Sizes)

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Quick service on a national scale is available for your needs through Baker's sales and engineering staff at these points:

Albuquerque	Denver	Los Angeles	Pittsburgh	Salt Lake City
Baltimore	Des Moines	Minneapolis	Rochester	So. Norwalk, Conn.
Boston	Ft. Worth	New York City	San Antonio	Tulsa
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Dallas	Little Rock	Oklahoma City	St. Louis	

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ATTRACTIVE DEALER FRANCHISES AVAILABLE • WRITE FOR DETAILS

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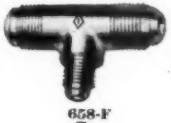
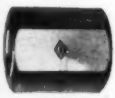
IMPERIAL VALVES AND FITTINGS

THE extra-severe tests of refrigeration service are fully met by Imperial valves and fittings. The valves are made from brass forgings, non-porous and leakproof. In the fittings, the nuts, tees, etc., are also made from brass forgings, and the connectors and unions from extruded bronze rod, not subject to seasonal cracking. A few examples are shown:

657-F
Elbow



658-F
Tee



660-F
Valve Connector

642-F
Union

641-F Nut
Frost Proof

44-S
TEE
Solder Fitting

661-F
Reducer

Licensed under Streamline patent Nos. 1,770,852. 1,776,502 and 1,890,998.

"SYLPAK" ANGLE SHUTOFF VALVE

Operates on the sylphon principle; the sylphon can be changed while the valve is under pressure, without losing any refrigerant. 100,000 cycles of oscillation in actual test, without rupture. **192-C.** ¼", ⅜", ½", **$2.20.** ⅝", **$3.60.** Also furnished in 2 and 3 way line shutoff valves.

TWO-WAY BACKSEATING SHUTOFF VALVE

For multiple installations. A metal-to-metal seat forms a seal against leakage of gas or liquid. Packing easily replaced during service.

93-C. ¼", 5/16", ⅜", ½", **$2.31.** ⅝", **$3.04.**

LIQUID RECEIVER TANK VALVE

With condenser line connection. Eliminates need of opening at other end of tank; less chance of leak. **47-C, $2.00.**

Order from your jobber. Write also for Catalog No. 77-C.

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